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UNCLAS SECTION 01 OF 03 NEW DELHI 000942

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¶1. (U) SUMMARY: The Ministry of Science and Technology's Department of Science and Technology (DST), the Confederation of Indian Industries (CII), and the Tamil Nadu Technology Development Promotion Council, sponsored a conclave in Delhi April 14 and 15 to identify industry opportunities in Indian nanotechnology. The event revealed that despite massive government funding and some progress in academic capacity building, the effort remains scattered and collaboration between industry and academia is still elusive. Much of the existing research appears focused on material applications for energy and coatings; research into health and agriculture applications and more advanced technologies such as nanoelectronics have been slow to begin. Participants uniformly agreed that more research needs to be done to understand the safety and unintended impact of nanomaterials on human health and the environment. END SUMMARY

GOI SPENDING MONEY, INDUSTRY COLLABORATION MISSING

¶2. (U) Since initiating the nano mission in 2001, the Government of India (GOI) has spent about INR 7.2 billion (USD 144 million), funded 175 projects, established 11 centers for nanotechnology development, started 15 nanotechnology masters degree programs, had more than 1000 students registered for PhDs in nanotechnology, and is planning to develop new dedicated nanotechnology institutes at Mohali, Bangalore and Kolkata. The Eleventh Five Year Plan allocated INR 10 billion (USD 200 million) to nanotechnology initiatives - 48 percent for basic research and capacity building and 52 percent for technological applications including funding

industries and new ventures.

¶3. (U) DST Secretary Dr. Ramasami and Dr. V. Rao Aiyagari, Director of the DST's Nano Mission, both spoke at the conclave regarding GOI efforts in the field, but the Department of Information Technology and the Ministry of New and Renewable Energy, both of which fund heavily in nanotechnology for photonics, light emitting diodes, solar energy, and nanoelectronics, were noticeably absent from the event. Dr. Dipankar Banerjee, Chief R&D Controller at India's Defense Research and Development Organization (DRDO), said that DRDO was working on a wide range of nanotechnology-enabled technologies in energy, photonics, high energy materials, sensors (especially for identifying chemical weapons), bio nanotechnology, propulsion technologies, and carbon nanotube-based applications.

¶4. (U) Dr. Ramasami said that the only way to achieve success in nanotechnology was to overcome India's industry and academia stovepipes and encourage collaboration. Despite this professed view, it is unclear how DST intends to achieve an effective mix of the two. Very few industries were present at the conclave and most attended primarily as observers. Dr. Vidyasagar, Chairman of the CII Nanotechnology group and Senior Vice president of Tata Consultancy Services, told ESTFSN that the industry saw significant potential opportunity in nanotechnology but was slow to pursue it because of the high capital costs. He said that although roughly 60 Indian companies are involved in nanotechnology, larger-scale industry efforts and government financial assistance were needed to see significant improvements.

NANOMATERIALS FOR ENERGY

¶5. (U) Several presentations were focused on efforts to identify energy and green solutions using nanomaterials. Dr. Sonde, Executive Vice President of Thermax limited, mentioned that his company was focused on solar thermal concentrator technologies and hoped to have a product in the market in a year or so. Dr. Giriraj Niyati, Corporate R&D Vice President for Moser Baer, said they were actively collaborating with companies in the U.S., Europe, and Japan on nanotechnology-enabled solutions for silicon solar cells, concentrators, and thin film solar cell technologies. He said they had invested USD 2 billion in a project to develop, by the end of 2010, solar panels capable of producing one gigawatt of power per year. Dr. Neeleshwar from Guru Gobind Singh Indraprastha University is researching energy generation using thermoelectric materials. The Innovation Centre for Applied Nanotechnology has developed over 50 environmentally friendly nanomaterial-enabled paints and coatings for application on walls, glasses, wood, and ceramics, according to CEO Dr. Arup Kumar Chatterjee.

AGRICULTURE AND HEALTHCARE RESEARCH SLOW TO START

¶6. (U) Conclave attendees suggested that agricultural-related nanotechnology research was still in an exploratory phase and suffered from a lack of interdisciplinary activity. Dr. Rajendran, Director of the Nano Science and Technology Center at the K. S. Rangasamy College of Technology, said that their center was focused on developing nanoparticles from natural sources and claimed to have grown enhanced quality maize using 20 nanometer silicon dioxide particles produced from rice husk. According to Principal Scientist Dr. Kalpana Sastry, the National Academy of Agricultural Research Management has developed a database of all nanotechnology-enabled agricultural technologies and practices to encourage collaboration. Indian Agricultural Research Institute National Fellow Dr. Prasanna indicated that technologies of interest include DNA finger printing or bar-coding, gene and protein expression profiling, genome sequencing, biotic and abiotic stress studies, plant and animal disease diagnostic tests, post harvest preservation and management technologies, soil and water management, and precise and smart fertilizer delivery capabilities.

¶7. (U) Health applications have also been very slow to emerge. Dr. ¶S. Mokkapati, Deputy Director General of the Nano Medicine Cell at the GOI's Indian Council for Medical Research, said that activity

was at a very early stage due to concern about toxicological effects and a lack of collaboration between medical institutions and other researchers.

CONCERNED ABOUT SAFETY

¶8. (U) Participants repeatedly insisted on the need for more research into the safety of nanomaterials and their potential unintended effects on human health and the environment. Dr. Ramasami and Dr. Rao mentioned that DST was open to collaboration on identifying hazards associated with nanotechnology and ways to monitor them. Dr. Banerjee said that a more concentrated effort on toxicity was needed before DRDO would seriously consider nonmaterial-based applications.

¶9. (SBU) COMMENT: Few of the presenters provided any specific concrete examples of their nanotechnology developments, and most repeated the same broad calls for what could or should be done that have been voiced by Indian scientists and policy makers for the last

several years. While health and safety concerns are legitimate, they are not the main culprit behind India's lack of significant progress. The barriers to effective nanotechnology development in India that were identified by ESTOffs in 2006 (reftels) remain barriers three years later. Without a change in the Indian cultural attitudes and business models that tend to focus on low-value added services and products, family controlled businesses, and fear of failure, no amount of funding by the GOI will succeed in making India competitive in the realm of nanotechnology. END COMMENT

BURLEIGH